Nevada Greater Sage-grouse Draft Habitat Suitability Index, Draft Habitat Suitability Map, and Draft Management Categories

Prepared by the Sagebrush Ecosystem Technical Team

February 2014

The following outlines the habitat suitability index, habitat suitability mapping, and management categories as developed by the State of Nevada Sagebrush Ecosystem Program for State of Nevada Greater Sage-grouse Plan and for the State Alternative (E) of the Nevada and Northeaster California Greater Sage-grouse Sub-Regional LUPA and EIS.

DRAFT Habitat Suitability Index for Greater Sage-grouse in Nevada (February 2014)

This map presents the Nevada Habitat Suitability Index that provides a relative suitability of greater sage-grouse habitat in Nevada on a scale of 0 to 1 (excluding the Bi-State DPS). These data were developed in collaboration with the U.S. Geological Survey.

General Methods

Resource Selection Functions (RSFs) were used to develop habitat suitability indices that rank areas based on a continuum of highly used to strongly avoided. This modeling is driven by actual location data obtained using radio-telemetry information. RSFs were developed by modeling the relative probability of occurrence as a function of different environmental factors which consisted of vegetation types, pinyon-juniper cover classes, agriculture, elevation, ruggedness, slope, and water sources. These factors were measured at multiple spatial scales that reflect movement patterns of sage-grouse. The modeling process contrasted these environmental factors for sites used by sage-grouse (>31,000 sage-grouse telemetry locations; >10 years of telemetry data) to available sites (randomly generated locations). Contrasting the environmental factors of used versus available sites provided information about what factors were correlated with greater sage-grouse selection or avoidance (e.g., streams, pinyon-juniper).

RSFs were applied to the map layers developed above to calculate an overall probability of use per pixel. This created a single greater sage-grouse habitat suitability index and resulted in a surface of predicted use by sage-grouse across Nevada. This surface is represented by probability values that ranged across a continuous spectrum of 0.0 to 1.0.

This February 2014 Habitat Suitability Index is a draft product. Continued modeling and incorporation of additional data will continue and a final habitat suitability index will be available in early 2015.

DRAFT Suitable Habitat for Greater Sage-grouse in Nevada (February 2014)

This map displays the extent of suitable habitat for greater sage-grouse in Nevada (excluding the Bi-State DPS). The Sagebrush Ecosystem Program developed this map using the Habitat Suitability Index developed above.

General Methods

To identify suitable habitat, the habitat suitability index described above was reclassified to binary values (suitable habitat and non-suitable habitat) by choosing suitability values above a cutoff value based on the mean of the index values minus 1.5 standard deviations. This cut-off point was also validated by a cost-benefit ratio looking at the trade-off between additional area to telemetry points. The equalization point occurs at 1.5 standard deviations. The binary map was then aggregated at the 1 km scale to account for corridors and smoothed at the 1.2 km scale to remove "islands".

This February 2014 Nevada Habitat Suitability Map is a draft product. A final product will be available in early 2015.

DRAFT Management Categories for Greater Sage-grouse in Nevada (February 2014)

The Sagebrush Ecosystem Program developed the management categories using the Habitat Suitability Index developed above as well as modeled space use by greater sage-grouse. These categories were developed to be used with the management criteria outlined in Table 3-1 of the State of Nevada Greater Sage-grouse Plan.

The Nevada Sage Grouse Management Area (SGMA) encompasses the general range of greater sage-grouse in the state of Nevada (excluding the Bi-State DPS). Proposed anthropogenic disturbances within the SGMA will trigger consultation with the SETT for assessment of impacts to sage-grouse and their habitat and compliance with SEC and other relevant agency policies. Please note that the express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. The SGMA should not be used for any other purpose.

Within the SGMA are four management categories that are defined below.

> The **Core Management Areas** encompass areas of high estimated sage-grouse use in suitable habitat in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State of Nevada and support the highest density of breeding populations.
>
> The **Priority Management Areas** encompass areas that are determined to be highly suitable habitat for sage-grouse that are not contained within the Core Management Areas.

The **General Management Areas** encompass areas determined to be suitable habitat for sage-grouse, though less suitable than Priority Management Areas and are not contained within the Core Management Areas.

The **Non-Habitat Management Areas** encompass areas determined to be unsuitable for greater sage-grouse.

General Methods

Habitat suitability categories – these categories are based on the habitat suitability index

High suitability habitat – mean index values minus 0.5 standard deviation (~70% sage-grouse use)

Moderate suitability habitat – mean index values minus 1.5 standard deviations (~93% sage-grouse use)

Non-suitable habitat – mean index values minus greater than 1.5 standard deviations

Space use index - these categories are based on (1) density of sage-grouse leks coupled with attendance at leks and (2) distance sage-grouse are found from leks based on telemetry data

High use areas – greater than or equal to 85th percentile of the space use index

Low use areas– less than 85th percentile of the space use index

The intersection of the 3 suitability definitions and the 2 space use definitions were developed into the four management categories.

Core Management Area – areas of suitable sage-grouse habitat use found within areas of estimated high space use.

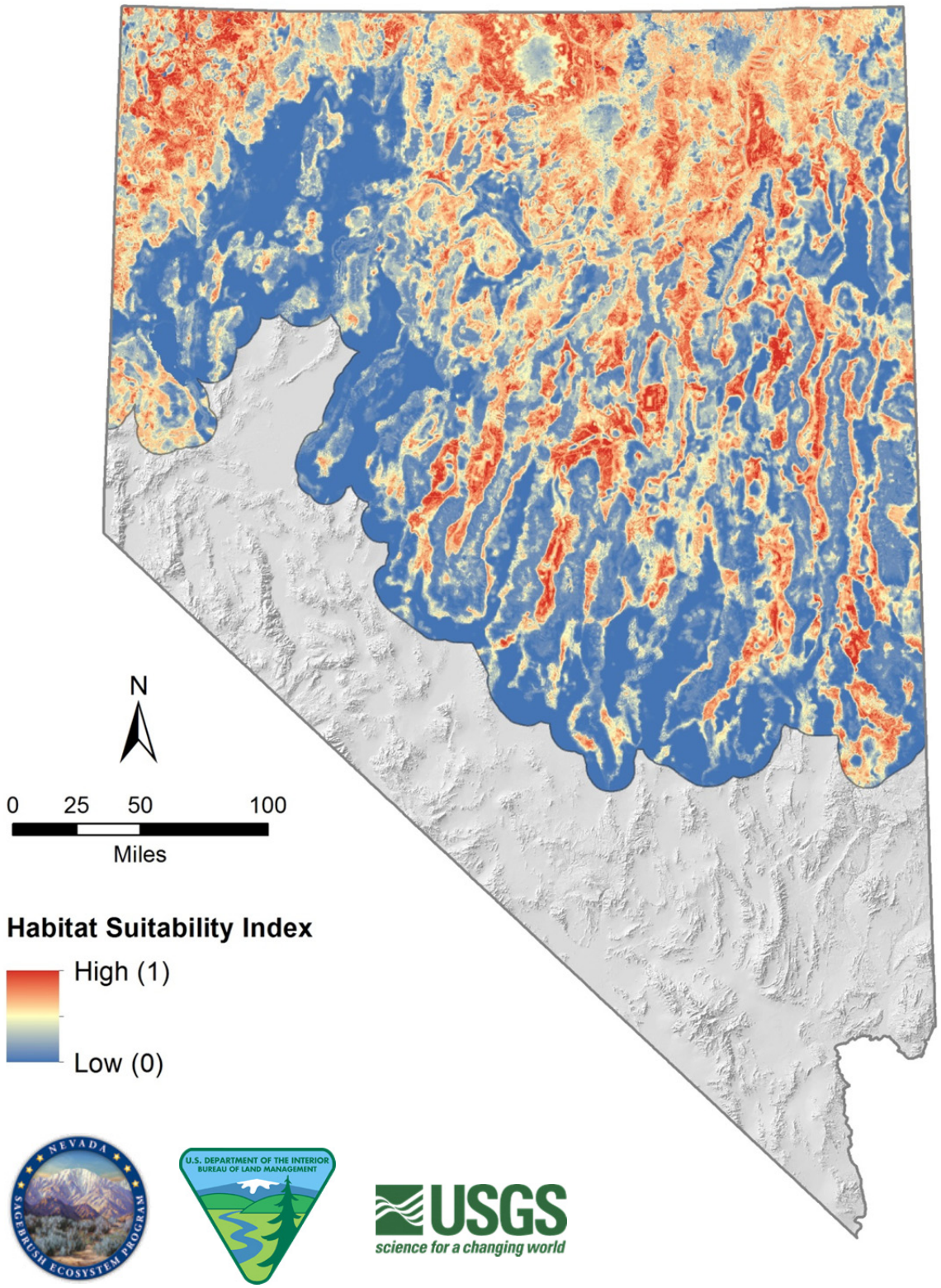
Priority Management Area – high suitability habitat that is found in areas of estimated low space use, and areas of non-habitat that overlap with areas of estimated high space use

General Management Area – moderate suitability habitat that is found in areas of estimated low space use.

Non-habitat Management Area – non-suitable habitat that is found in areas of estimated low space use.

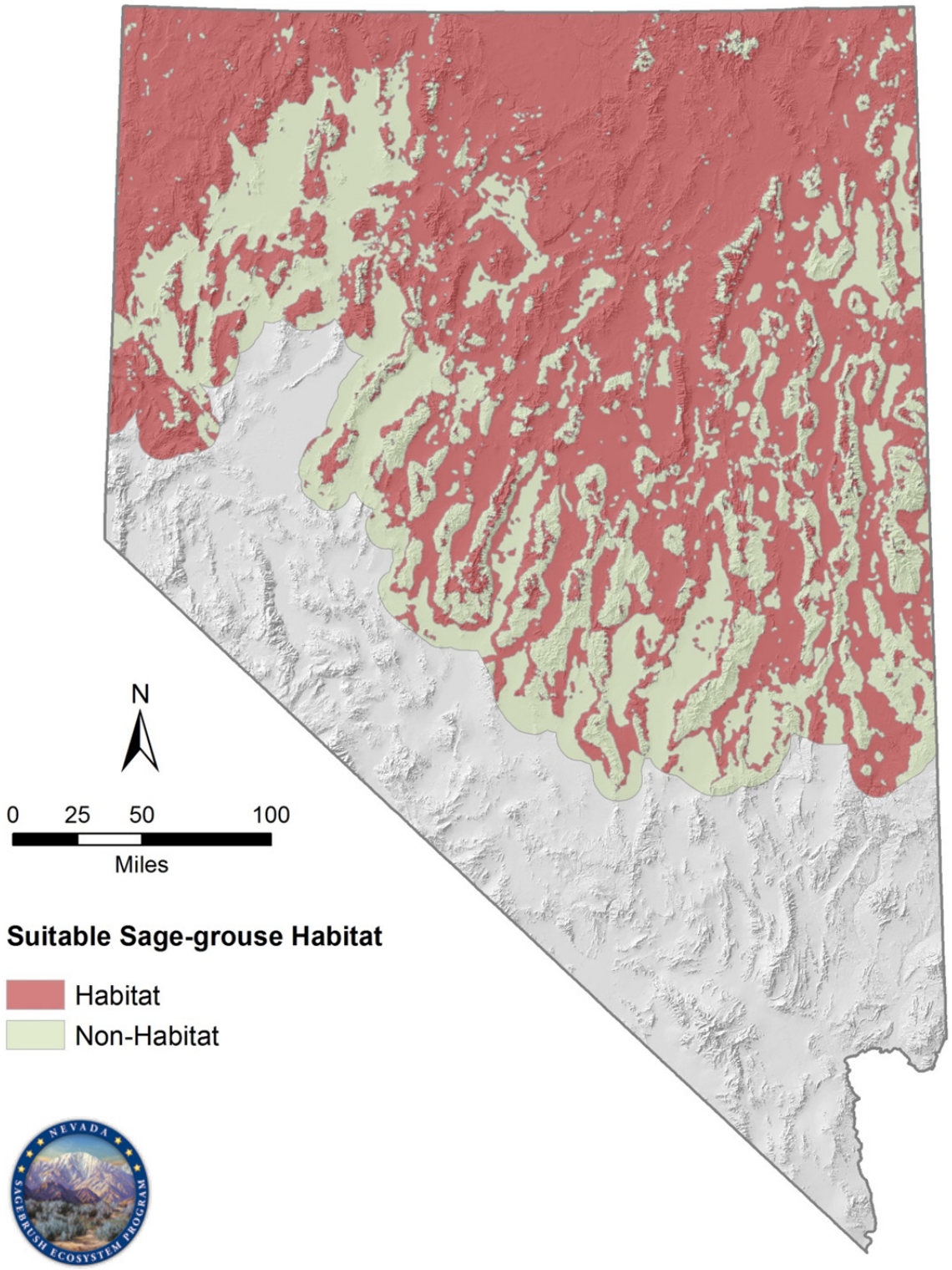
This February 2014 Nevada Management Categories Map is a draft product. A final product will be available in early 2015.

DRAFT Habitat Suitability Index for Greater Sage-grouse in Nevada (February 2014)



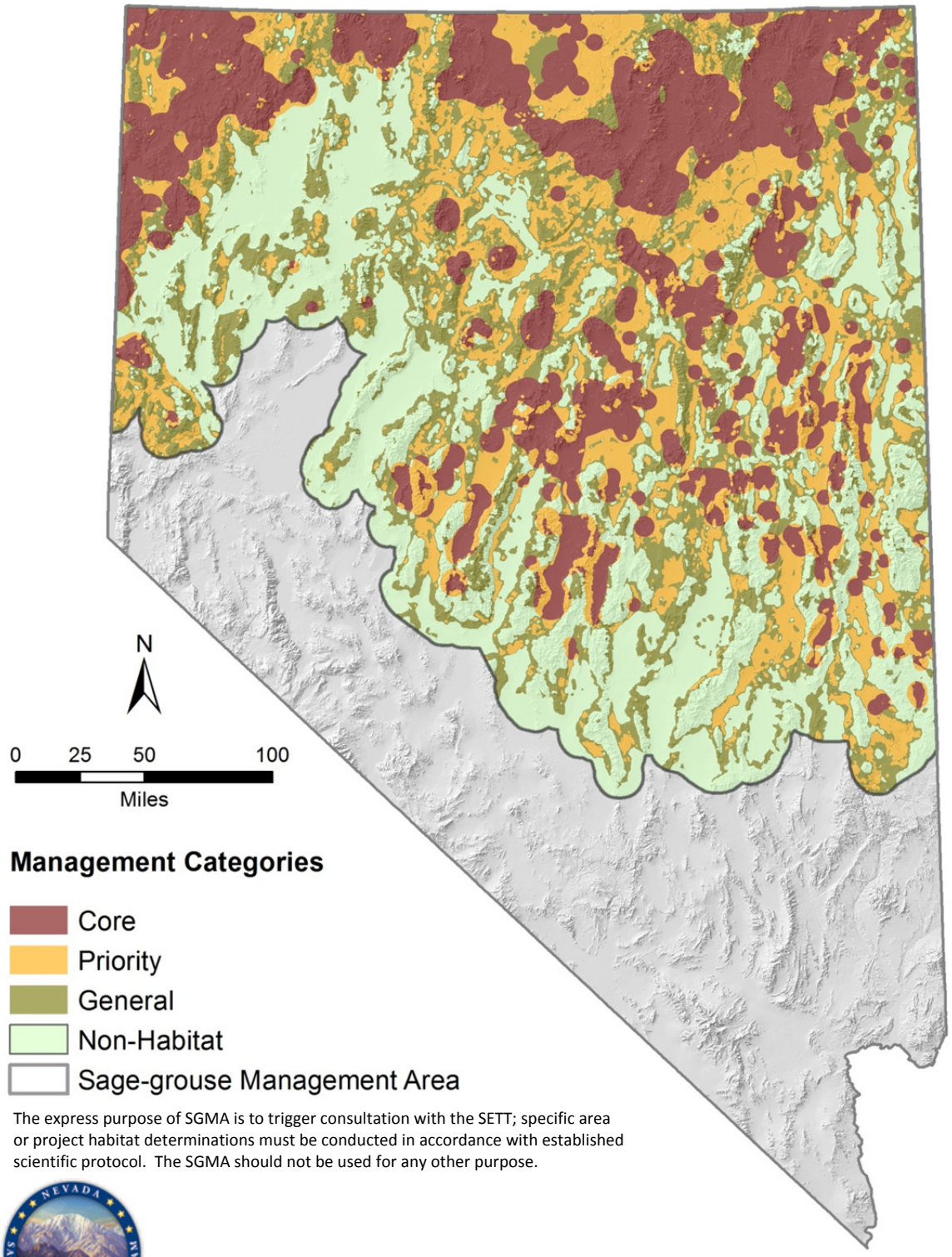
Draft map of a relative habitat suitability index modeled for greater sage-grouse in Nevada. The map was developed in collaboration with the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.

DRAFT Suitable Habitat for Greater Sage-grouse in Nevada (February 2014)



Draft map of habitat and non-habitat for greater sage-grouse in Nevada. The map was developed by the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.

DRAFT Management Categories for Greater Sage-grouse in Nevada (February 2014)



The express purpose of SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. The SGMA should not be used for any other purpose.

Draft map of management categories for greater sage-grouse in Nevada. The map was developed by the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.